

A TAXONOMICAL REVISION OF THE GREATER ANTILLES SPECIES OF THE FERN FAMILY GLEICHENIACEÆ

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SUMMARY : The Greater Antilles is postulated as a natural region under the basis of paleophysiological studies which suggest that the Greater Antilles have not changed position or have been connected with the existing continents. The purpose of the present study is to delimit the species of the family *Gleicheniaceæ* present in this area, based upon available morphological, ecological, and cytological characters. In addition, this study contains their descriptions, keys, and distribution.

RÉSUMÉ : De récentes études paléogéographiques ont suggéré que les Grandes Antilles n'ont jamais été liées aux continents existants et n'ont pas changé de position, ce qui conduit à les considérer comme une région naturelle. Cette étude tente de délimiter les espèces de *Gleicheniaceæ* de cette région en tenant compte des caractères morphologiques, écologiques et cytologiques. Neuf espèces et un hybride sont reconnus : descriptions, clés et distribution.

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INTRODUCTION

Even when geomorphical features suggest a paleophysiological history in concordance with the concept of plate tectonics, there is little evidence that the Greater Antillan islands have changed position or have been connected with the existing continents.

Actually, the Caribbean islands illustrate an anomaly in the tectonic plate theory. As NAGLE (1972) reported, the data of the Caribbean area have not been satisfactorily integrated in this new, world-wide scheme. If the tectonic plate theory cannot incorporate key areas, such as those of the Caribbean, the hypothesis might best be reexamined. On the other hand, as he adds, there are enough geophysical models of the Caribbean emergence to satisfy everybody. Now, it is necessary to gather critical geological information for this area.

KHUDOLEY & MEYERHOFF (1971) have gathered previous information about Cuba, integrating for the first time the new and the old, dispersed data. They presented it as a sequential study of paleogeographical maps; their work showed that the Greater Antilles have not significantly moved laterally, nor have they rotated. There is no convincing evidence (accord-

ing to NAGLE, 1972) of any other kind of movement. Because of this, it is possible to study the flora of the Greater Antilles as a natural region.

I present here the first results of a study that I am carrying out on the New World's species of the fern family *Gleicheniaceae*.

Owing to the restrictions inherent in considering only a reduced portion of the whole area in which taxa may occur, I think it is useful not only to define exactly the taxa existing in the Greater Antilles, but also to characterize them fully in such a way as to facilitate identification and subsequent comparison in other areas where they occur.

The number of basionyms assignable to this family in the New World is about 90. Since many kinds of characters important diagnostically cannot be fully judged from incomplete dried specimens, more field study is needed to establish distinctions between the species more clearly. But the distinctions among the species occurring in the Greater Antilles are clarified in the present work.

The gross morphology of specimens contained in the herbaria P, B, BM, PR, S, US, has been studied. In addition to the comparative method of herbarium specimen study, the descriptions have been amplified by observations based upon microscopic preparations of morphological features and of spores. Types and synonymy have been clarified wherever has been possible.

FROND ARCHITECTURE AND TERMINOLOGY

HOLTUM (1957*b*) has proposed a new terminology for the purpose of describing the morphology and growth habit of ferns of this family. Although in some species, the main axis is "due to a succession of dichotomies", in others it is due to the elongation of the central bud in a succession of trichotomies. The first has a zig-zag "rachis", the second a straight one. It is in effect a single structure and can be called a rachis for practical purposes. Regarding this rachis as a unity (although it may be of composite or sympodial evolutionary origin), we can call the pairs of branches which it bears primary rachis branches, or branches of the first order. Such branches only, and no others, are produced by subgenus *Diplopterygium* (fig. 1).

When a primary branch in turn produces another pair of branches, these can be called branches of the second order. Similarly, we can have branches of a third, fourth, or fifth order, etc. *Dicranopteris* (fig. 1) provides an example of several orders.

UNDERWOOD (1907) has used the term "order" in a different sense, one which would not seem to be most appropriate.

For some descriptive purposes, it could be more convenient to begin at the distal parts of the branching, because these bear the leafy portion of the lamina and the sori. So, we may call one of the pairs of branches at an ultimate pseudo-dichotomy an ultimate branch (such a branch

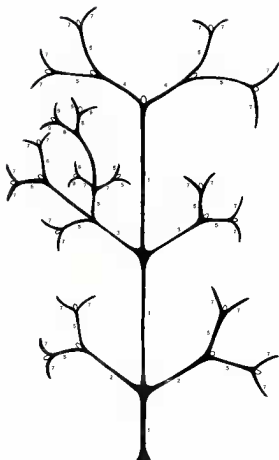


Fig 1.

completes its growth and has no dormant bud), and the branch between it and the preceding pseudo-dichotomy the penultimate branch.

In many species of this family, only the ultimate branches are leafy, and these may be branches of the first order or of any of the higher orders (fig. 1).

Where the bud of a primary branch is not permanently dormant, but continues to grow onwards beyond its pair of secondary branches (fig. 1), we can still call this a primary branch and say that it has two (or more) pairs of secondary branches.

The family nomenclature used here follows PICHÉ-SERMOLLI (1970).

GENERIC CLASSIFICATION

Almost all authors have treated this family as a single genus, *Gleichenia*, or have segregated into other genera one or two species, leaving a residual genus too large to be convenient, but fortunately one composed of natural and easily distinguished groups. Others, such as COPELAND (1947), who follows PRESL (1836, p. 47 et seq.), and CHRISTENSEN (1938) p. 530, have treated such groups as genera.

Later HOLTUM (1957a, b) diligently studied the components of this family and proposed the classification adopted here.

Aspects of the nomenclature are discussed and clarified by HOLTUM (1957b, 1959, 1973). He accepts two genera, *Gleichenia* J. E. Smith and *Dicranopteris* Bernh. The first has three subgenera, *Gleichenia*, *Mertensia*, and *Diplopterygium*; the second has two subgenera, *Dicranopteris* and *Acropterygium*.

1. The subgenus *Diplopterygium* proposed by DIELS (1900) (and adopted by HOLTUM (1957a) as a section of *Gleichenia*, corresponds to the genus *Hicriopteris sensu* Copel., not Presl. The type species of *Hicriopteris* Presl is *H. speciosa* [= *Dicranopteris speciosa* (Presl) Holtt.].

2. The subgenus *Mertensia* was first used in this rank by HOOKER (1844), although with a larger content. This name was first proposed by WILLDENOW (1804) as a generic name to cover all known members of the family with larger divisions of the lamina than the original *G. polypodioides* (Thunb.) Smith; but at this level the use of the name is illegitimate since it was previously proposed by ROTH (1797) for a genus of the family *Boraginaceae*; this was noted by BERNHARDI (1806) who proposed the genus *Dicranopteris* to include *Mertensia* Willd. (1804). It should be noted that RADDI, DESVAUX, BRACKENRIDGE, and STURM published species under this name and FÉE continued to recognize *Mertensia* and to publish species in this genus until 1869. In 1856, HASKARL acknowledged anew that the name *Mertensia* was already otherwise employed and adopted the generic name *Sticherus* Presl, for the subgenus *Mertensia* of the present study.

Cytological evidence clearly demonstrates that *Gleichenia* in its broad sense was an unsatisfactory genus formed of very diverse elements. Table I shows the different species for which the number of chromosomes is presently known; these have been arranged according to the present study, and one can see a strict correlation with the classification adopted here; each division contains a different basic number, and thus supports also the separation of the genus *Dicranopteris* into two subgenera (see also DUEK, ACEVEDO & EDELMAN (1977)). The subgenus *Acropterygium* was adopted by HOLTUM (1957a) from a section name established by DIELS (1900).

TABLE 1 : CHROMOSOME NUMBERS IN THE SPECIES OF GLEICHENIACEÆ ARRANGED ACCORDING TO THE PRESENT TREATMENT¹

GENUS	SUBGENUS	SPECIES	CHROMOSOME NUMBER	REFERENCE
<i>Gleichenia</i>	<i>Gleichenia</i>	<i>circinata</i>	$n = 20$	BROWNLIE (1958)
		<i>longissima</i>	$2n = 40$	ROY & PANDEY (<i>in</i> FABBRI, 1963)
		<i>microphylla</i>	$n = 20$ & 22	BROWNLIE (1961, & <i>in</i> FABBRI, 1963)
	<i>Diplopterygium</i>	<i>glauca</i>	$n = 56$	MEHRA & SINGH (1956)
		<i>banerostii</i>	$n = 56$	WALKER (1966)
	<i>Mertensia</i>	<i>cunninghamii</i>	$n = 34$	BROWNLIE (1958)
		<i>brackenridgeii</i>	$n = 34$	BROWNLIE (<i>in</i> FABBRI, 1963)
		<i>flabellata</i>	$n = 34$	BROWNLIE (<i>in</i> FABBRI, 1963)
		<i>bifida</i>	$n = 34$	WALKER (1966)
		<i>palmata</i>	$n = 34$	WALKER (1966)
		<i>jamaicensis</i>	$n = 68$; $2n = 136$	WALKER (1966)
<i>Dicranopteris</i>	<i>Dicranopteris</i>	<i>linearis</i>	$n = 39$	MEHRA & SINGH (1956)
			$n = 78$	MANTON & SLEDGE (1954), NINAN (1956)
		<i>linearis</i> var. <i>malayana</i>	$n = 39$	MANTON & SLEDGE (1954)
	<i>Acropterygium</i>	<i>pectinata</i>	$n = 43$	WALKER (1966)

1. With data from WALKER (1966).

GLEICHENIACEÆ (R. Brown) Presl

Rel. Haenk. 1 (1) : 70 (1825) (« *Gleichenia* »).

— *Filices* trib. *Gleicheniæ* R. BROWN, Prod. Fl. Nov. Holl. 160 (1810).

TYPE GENUS : *Gleichenia* J. E. Smith

This family is known from the Upper Carboniferous, and in it belong the fossil genera *Oligocarpia* Goepfert, *Gleichenites* Goepfert, and *Gleicheniopsis* Tutin, and the living genera *Gleichenia* J. E. Smith and *Dicranopteris* Bernhardt.

Terrestrial plants; *rhizome* creeping, slender, covered with ciliate scales or branched hairs, the stele a protostele (solenostelic only in *Dicranopteris pectinata* (Willd.) Underw.), bearing fronds directly; *fronds* branched, *main rachis* bearing a series of pairs of branches, its bud periodically dormant while each successive pair of branches develops; each *primary branch* often bearing a pair of secondary branches and a permanently dormant bud between them, the process sometimes repeated several times; *ultimate branches* either bipinnatifid or pinnatifid, the *laminae* (whether of an ultimate branch, or leaflet of an ultimate branch) cut almost to the costa; *veins* free, simple dichotomies, or pinnately forked; *sori* of 2-15 or more sporangia, attached to a small receptacle born laterally on a vein, never terminal, all sporangia in one sorus developing simultaneously, indusium lacking; *sporangia* often with branched hairs or scales, with a complete, oblique annulus, dehiscing vertically, containing ca. 200-800 or more spores; *spores* monolete or trilete, without a perispore, smooth, translucent, colorless.

Gametophyte: At first cordate, then ribbon-like with a heavy mid-rib, finally branching at the apex; rhizoids stiff, abundant, usually reddish-brown; two-celled glandular hairs developed by many species in association with archegonia and also on the gametophyte margin; antheridia comparatively large and complex in structure (some more so than others); archegonia with long neck directed towards the apex of the prothallus; no cases of apogamy observed.

KEY TO THE GENERA

- 1. Fronds with scales; sori of 2-5 sporangia, with paraphyses; veins simple or once-forked *Gleichenia*
- 1'. Fronds without scales; sori of 8-15 or more sporangia, without paraphyses; veins 2-4-forked *Dicranopteris*

GLEICHENIA J.E. Smith

Mem. Acad., Turin 5 : 419, tab. 9, fig. 10 (1793), *nom. cons.*, non NECKER 1790.

— *Calymella* PRESL, Tent. Pterid. : 48 (1836).

— *Gleichenastrum* PRESL, Abh. K. Bohm. Ges. Wiss. 5 (5) : 338 (1848).

Rhizome dichotomously branched, protostelic, covered with scales; fronds of indefinite growth in length (except sometimes at high altitudes), bearing *primary branches* in pairs, the dormant bud of the main rachis in some cases protected by a pair of stipule-like leaflets of distinctive form (such *stipular leaflets* less often present in conjunction with dormant buds of lateral branch-systems); *primary branches* often each bearing a pair of *secondary branches* with an usually dormant bud between them, the process sometimes repeated to produce ultimate branches of the fourth or fifth orders; *ultimate branches* either pinnatifid or bipinnatifid; *laminae* always cut to the costa (pectinate), forming ultimate segments as pinnules, with a midrib extending to the apex, *veins* in each ultimate segment pinnate, simple, or once-forked, *sori* one or several on each ultimate segment, dorsal on the acroscopic branch of a forked vein, each consisting of 2-5 large *sporangia*, paraphyses often present as small stellate hairs or scales, *spores* monolete or trilete, 256 or more in each sporangium.

TYPE SPECIES : *Gleichenia polypodioides* (L.) J. E. Smith (= *Onoclea polypodioides* L., 1771).

DISTRIBUTION : Pantropic; Southern Africa, Mascarene Islands, Australasia.

Three subgenera are recognized; *Gleichenia*, *Mertensia* [Willd.] Diels, and *Diplopterygium* (Diels) Holtt.; only the last two occur in the Greater Antilles.

KEY TO THE SUBGENERA AND SPECIES OF *GLEICHENIA*
IN THE GREATER ANTILLES

- | | | |
|----|--|-------------------------|
| 1. | Ultimate segments not much longer than wide; one sorus on each segment; veins simple; midrib not elevated; spores trilete (not represented in the Greater Antilles)..... | subg. <i>Gleichenia</i> |
| 1' | Ultimate segments elongate; several sori on each segment; veins once-forked; midrib elevated | 2 |
| 2. | Ultimate branches bipinnatifid. Main rachis glabrous, only developing primary branches; spores trilete (subg. <i>Diplopterygium</i>).... | 1. <i>G. bancroftii</i> |
| 2' | Ultimate branches pinnatifid (subg. <i>Mertensia</i>) | 3 |
| 3. | Main rachis glabrous. Ultimate segments glabrous | 7 |
| 3' | Main rachis with scales | 4 |
| 4. | Ultimate segments glabrous, 5-11 mm long; veins 9-15 pairs. 2. <i>G. jamaicensis</i> | |
| 4' | Ultimate segments with hairs | 5 |
| 5. | Ultimate segments glaucous, 30 mm or more long; veins 18-35 pairs | 3. <i>G. bifida</i> |
| 5' | Ultimate segments not glaucous, less than 30 mm long | 6 |
| 6. | Ultimate segments 14-19 mm long, veins 16-25 pairs.. | 4. <i>G. palmata</i> |
| 6' | Ultimate segments 10-28 mm long, veins 13-32 pairs. | 6. <i>G. × leonis</i> |
| 7. | Primary branches pectinate; ultimate segments remote.
Ultimate segments 29-71 mm long, veins 45-95 pairs. | 5. <i>G. remota</i> |
| 7' | Primary branches not pectinate; ultimate segments contiguous. | 8 |

8. Primary branches with scales; ultimate segments oblong,
veins 10-12 pairs..... 7. *G. rubiginosa*
8' Primary branches glabrous; ultimate segments ovate, veins
5-7 pairs 8. *G. revoluta*

subg. **DIPLOPTERYGIUM** (Diels) Holttum

Reinwardtia 4 : 261 (1957).

- *Gleichenia* subg. *Mertensia* sect. *Diplopterygium* DIELS, in ENGL. & PRANTL, Nat. Pflanz. 1 (4) : 353 (1900).
— *Diplopterygium* (DIELS) NAKAI, Bull. Nat. Sci. Mus. Tokyo 29 : 47 (1950).
— *Dicranopteris sensu* UNDERW., Bull. Torrey Bot. Club 34 : 249 (1907), p.p.
— *Hicriopteris* auct. non PRESL : CHING, Sunyatsenia 5 : 277 (1940); COPELAND, Gen. Fil. : 28 (1947).

Only the bud of the main rachis with periodic dormancy, protected with stipule-like leaflets, bearing pairs of primary branches and no other branches developing; primary (always ultimate) branches bipinnatifid; segments with an elevated midrib, veins once-forked; sori several in each ultimate segments; spores monolete or trilete.

TYPE : *Gleichenia glauca* (Thunb.) Hook. (\equiv *Polypodium glaucum* Thunb., 1784).

DISTRIBUTION: More than 20 species in northeastern India, Burma, Indochina, China, Japan, Malaysia, Polynesia, Hawaii, and tropical America (1 species). According to HOLTUM (1959), this subgenus is far more diversified in Malaysia than elsewhere.

1. *Gleichenia bancroftii* Hook.

Sp. Fil. 1 : 5, tab. 4A (1844).

- *Mertensia bancroftii* (HOOKER) KUNZE var. *vitellina* KUNZE, Linnæa 18 : 307 (1844); type : Moritz Coll. I.11, Venezuela, Caracas (LZ, *delet.*; iso-, B!).
— *Gleichenia bancroftii* HOOK. var. *gracilis* JENM., Bull. Bot. Dept. Jamaica 5 : 276 (1898); type : Jenman s.n., Jamaica, 1500-1800 m, NY?
— *Gleichenia brunei* CHRIST, Bull. Herb. Boiss., ser. 2, 5 : 13 (1905); type : Brune 317, Costa Rica, El Desengaño, ca. 1400 m, P!
— *Dicranopteris brunei* (CHRIST) UNDERW., Bull. Torrey Bot. Club 34 : 253 (1907).

TYPE : *Bancroft*, Jamaica, BM!

CHROMOSOME NUMBER¹ : $n = 56$; $2x?$ (WALKER, 1966); $n = c. 56$ (MICKEL, WAGNER & CHEN, 1966).

Rhizome epigeous or partially hypogeous, fleshy, 6 mm in diameter, muricate, covered with rare, dark to light castaneous, lanceolate, very acuminate, glabrescent scales 7 mm long; *primary rachis* erect, 50-60 cm

1. n refers to chromosome number, where x refers to ploidy number.

long, 5 mm in diameter, stramineous and glabrous or at the base castaneous and rarely scaly, bearing a pair of long, bipinnate, primary branches, sometimes the bud of the primary branches bearing a second or third pair of primary branches in an acropetal succession; the bud of the primary rachis large, up to 2 cm long, densely covered with light to dark castaneous, ovate to deltoid-lanceolate, very acuminate scales; *primary branches* (pinnæ) bipinnate, determinate, oblong, 80-150 cm long, 25-50 cm wide, acuminate, the secondary rachis stout, smooth, 4 mm in diameter, above slightly carinate to the apex; pinnules opposite to subopposite, usually up to 2-3 cm distant, approximate to almost imbricate (rarely smaller, congested, up to 1-1.5 cm distant and nearly superposed), sessile, linear, 12-25 cm long, 3-4.5 cm wide; costa stramineous with thin, deciduous, deeply slashed, acuminate, yellowish scales; *ultimate* segments rigidly herbaceous, fragile, linear-ligulate, 1-2.2 × 0.1-0.25 cm, chiefly adnate and decurrent (the basal ones unequally contracted and subsessile, green-yellowish, glabrous, glaucous below, the costule elevated, stramineous, glabrescent, *veins* free, 15-17 pairs, once-forked near the base, the branches largely divergent; *sori* few, of 3-5 sporangia, on the acroscopic vein branch, inframedial, covered with a tuft of small, filiform, yellowish scales.

DISTRIBUTION: Cuba, Jamaica, Haiti, Santo Domingo, Guadeloupe, Martinique, Mexico, Guatemala, El Salvador, Honduras, Costa Rica, Venezuela, Colombia, Ecuador, Perú, Bolivia; principally at ca. 1000-1800 m altitude.

SELECTED SPECIMENS CITED: CUBA : *Ekman 14581*, Sierra Maestra, Pico Turquino, on the "Estríbo del Pinar" in an open place, a "fern savanna", ca. 1850 m, P, S, US. — JAMAICA : *Harris 7315*, near Nerohaven-Gap, B. — STO. DOMINGO : *Ekman 12909*, Cordillera Central, Prov. Santiago, Monoión, southwestern spur of Monte Gallo, ca. 1600 m, B. — HAITI : *Ekman 5455*, Port-au-Prince, Mome Malange, laterite on eruptives, ca. 1200 m, B.

subg. MERTENSIA [Willd.] Hooker

Sp. Filic. 1 : 4 (1844); *emend.* HOLTUM, Reinwardtia 4 : 2 (1957).

— *Mertensia* WILLD., Kongl. Vetensk. Akad. Nya Handl. 11 (25) : 163 (1804), *p.p.*, non ROTH 1797.

— *Gleichenia* J. E. SMITH subg. *Mertensia* (WILLD.) DIELS, in ENGL. & PRANTL, Nat. Pflanz. 1 (4) : 353 (1900), *p.p.*

— *Sticherus* PRESL, Tent. Pterid. : 51 (1836).

— *Gleichenia* subg. *Mertensia* sect. *Holopterygium* DIELS, in ENGL. & PRANTL, Nat. Pflanz. 1 (4) : 353 (1900).

— *Dicranopteris* auct. non BERNH. : UNDERW., Bull. Torrey Bot. Club 34 : 249 (1907), *p.p.*

Primary branches each ending in a dormant bud in the angle between a pair of secondary branches; secondary branches similar, the process usually repeated to produce pseudo-dichotomous branching of several orders; all these branches provided or not with a deeply pinnatifid lamina like that of the ultimate branches; segments with an elevated midrib, veins once-forked; sori several in each ultimate segment; spores monolete.

TYPE SPECIES: *Gleichenia truncata* (Willd.) Spr. (\equiv *Mertensia truncata* Willd. 1804) (lectotype¹, HOLTUM, 1957a, 1973).

DISTRIBUTION: This subgenus includes far more species than any other major division of the family and occurs on all continents, but mainly south of the equator.

COMMENTARY:

As in other parts of the family, the characters and distribution of scales and hairs are important diagnostically in this subgenus. The number of times the lateral branch-systems are forked (the number of orders of forking) is probably important, but shows considerable variation within a species according to the age of the plant and to environmental conditions; furthermore, this cannot be fully judged from incomplete, dried specimens. A more important kind of character is the relative length of branches of the first and ultimate orders. But in some species one frond will have branch-systems of 2 orders with long ultimate branches, whereas other fronds may have 3 orders with much shorter ultimate branches.

The glaucous character of the lower surface of the lamina may be significant, but is easily destroyed by heat in drying.

2. *Gleichenia jamaicensis* (Underw.) C. Chr.

Ind. Fil. Suppl. 1 : 44 (1913).

— *Dicranopteris jamaicensis* UNDERW., Bull. Torrey Bot. Club 34 : 258 (1907).

— *Sticherus jamaicensis* (UNDERW.) NAKAI, Bull. Nat. Sci. Mus. Tokyo 29 : 20 (1950).

TYPE : *Underwood 1511*, Jamaica, Blue Mountains, NY.

CHROMOSOME NUMBER: $n = 68$; 4x Sexual (WALKER, 1966).

Small, erect plant, ca. 1 m high, with branches up to the fifth order; *rhizome* hypogeous, long-creeping, semiterete, ligneous, freely branched, 3 mm in diameter, covered with imbricate, persistent, erect, rigid, flat, purple, concolorous, uniform, clathrate, basifixed, lanceolate scales having a piliform apex, roundish at the base, with a ciliate margin, and one layer of cells; *primary rachis* 40-70 cm long, 3 mm in diameter, circular in cross-section, ligneous, light castaneous, shining, with deciduous scales; the bud of the primary rachis covered with imbricate, persistent, erect, rigid, plane, light castaneous, shining with light margin, clathrate, basifixed, ovate scales having an acuminate apex, cordate at the base, the margin ciliate, and with more than one layer of cells; one pair of *primary branches*, these unequal, 4.5 and 6.5 cm long, 2 mm in diameter, lacking leaflets, covered with a few scales like those of the costa; bud of the secondary

1. WILLDENOW's generic name *Mertensia* being illegitimate, this name is correct in subgeneric rank, but only as defined by HOOKER in 1844 (ICBN, Art. 72, Note). Since HOOKER discarded *Mertensia truncata* Willd. among the 'dubious species', as PICHI SERMOLLI, *Webbia* 26: 520 (1972) pointed out, the choice of this species as lectotype remains highly debatable, despite the good taxonomic arguments as given by HOLTUM, 1973 (Note of the Editor).

rachis covered with scales like those of the primary rachis; each secondary rachis bearing one pair of equal secondary branches, these ca. 3 cm long, 2 mm in diameter, covered with stipule-like leaflets and densely with scales like those of the costa; the bud of the tertiary rachis like the secondary one; each tertiary rachis bearing a pair of equal tertiary branches, pinnate, 9 cm long, 2 cm broad, sometimes these subdivided in equal branches of the fourth or fifth order, 5 cm long, 2 cm broad; ultimate branches (3rd to 5th order) linear to linear-lanceolate, usually falcate, densely covered below the costa with erect, rigid, plane, persistent, light castaneous, bright, concolorous, uniform, clathrate, basipeltate, ovate scales having a very acuminate (shortly piliform) apex, cordate at the base, the margin erose, with one layer of cells; *ultimate segments* 7-13 × 2-3 mm, rigidly herbaceous, approximate, ovate-lanceolate, subacute at the apex, the margin entire, revolute, glabrescent, dark; *veins* somewhat elevated, 9-15 pairs, once-forked near the base, covered with a few, short, simple, glandular hairs; *sori* few, 3 or 4 sporangia, on the acroscopic vein branch, medial.

DISTRIBUTION: Cuba, Jamaica and Santo Domingo, at altitudes ca. 1600-2200 m.

SELECTED SPECIMENS CITED: CUBA : *Ekman 7143*, Sierra Maestra, La Bayamesa, in the higher parts of the ridge between Río Oro and Río Yao, B, S, U.S. — SANTO DOMINGO : *Eggers 21736*, in Valle Nuevo, gregaria in pinetis, ca. 2000 m, B. — JAMAICA : *Fisher s.n.*, in the Blue Mountains near Chinchona, 15 miles from Kingston, S.

3. *Gleichenia bifida* (Willd.) Spreng.

Syst. Veg. 4 : 27 (1827).

- *Mertensia bifida* WILLD., Kongl. Vetensk. Akad. Nya Handl. 11 (25) : 168, *tab. 5, fig. B* (1804).
- *Dicranopteris bifida* (WILLD.) MAXON, North Amer. Flora 16 : 60 (1909).
- *Mertensia ferruginea* DESV., Berl. Mag. 5 : 307 (1811); type : *sine coll.*, French Guiana, P!
- *Gleichenia bifida* var. *ferruginea* (DESV.) ROSENST., Mém. Soc. Neuchât. Sci. Nat. 5 : 33 (1813).
- *Mertensia fulva* DESV., Mém. Soc. Linn. Paris 6 : 200 (1827); type : *sine coll.*, Jamaica.
- *Dicranopteris fulva* (DESV.) UNDERW., Bull. Torrey Bot. Club 34 : 255 (1907).
- *Gleichenia brevipubis* CHRIST, Bull. Herb. Boiss., ser. 2, 6 : 280 (1906); syntypes : *Wercklé s.n.*, Costa Rica, Valle del Río Navarro, ca. 1400 m, P!; *Alfaro 16871*, Meseta Central de San José, ca. 2000 m, P!
- *Dicranopteris cubensis* UNDERW., Bull. Torrey Bot. Club 34 : 253 (1907); type : *Underwood & Earle 1416*, Cuba near Baracoa, on clay banks, slopes of El Yunque, NY, probably.

TYPE : *Bredmeyer*, Venezuela, Caracas, B!

CHROMOSOME NUMBER : $n = 34$, $2x$; $n = 34$, $2n = c. 68$ (SORSA, 1968).

Plant erect; *rhizome* hypogeous, long-creeping, semiterete, ligneous, branched, 3-4 mm in diameter, dark castaneous, covered with imbricate, persistent, erect, rigid, plane, uniform, dark castaneous, concolorous,

shining, clathrate, basifixed, lanceolate scales having an acuminate apex, truncate at the base, the margin ciliate, with one layer of cells; *primary rachis* 35-45 cm long, 2.5 mm in diameter, semicircular in cross-section, ligneous, dark castaneous, shining, darker at the base and covered with deciduous scales, to stramineous at the apex and covered with semideciduous yellowish, ciliate scales, that extend by the costa to the lateral branches; *bud* of the *primary rachis* densely covered with soft, yellowish, concolorous, shining, plane, uniform, clathrate, basipeltate, ovate scales having an acute apex, truncate at the base, the margin ciliate, with one layer of cells; *primary branches* one, two, or more pairs, unequal, 2.5 and 7 cm long, with leaflets, glabrous; *bud* of the *secondary rachis* covered with scales like those of the *primary rachis*; each *secondary rachis* bearing one pair of equal *secondary branches*, with leaflets, densely covered with small, long-ciliate scales; *bud* of the *tertiary rachis* like that of the *secondary* one; each *tertiary rachis* bearing a pair of equal *tertiary branches* as *ultimate branches*, with leaflets, with scales like those of the *secondary branches*, linear, to linear-lanceolate, 30-55 cm long, 3-7 cm wide, usually somewhat curving, attenuate, acuminate at the apex; *ultimate segments* linear, cordate at the base and twice as long as broad, straight or falcate, the apex acute or obtuse, below densely covered with stellate hairs, the margin entire, revolute, *veins* 18-35 pairs, once-forked near the base, the branches largely divergents, elevated below, less evident above; *sori* of 3 or 4 (rarely 5) sporangia, on the acroscopic vein branch; inframedial, seemingly immersed in the tomentose laminae beneath. — Pl. 2.

DISTRIBUTION: Cuba, Jamaica, Haiti, Santo Domingo, Puerto Rico, St. Kitts, Monserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Trinidad, Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Venezuela, Brasil, Colombia, Bolivia.

SELECTED SPECIMENS CITED: CUBA : *Wright 921 p.p.*, prope villam Monte Verde dictam, P, B, BM, S, US. — JAMAICA : *Eggers 3598*, Catherine Peak, ca. 200 m, B. — STO. DOMINGO : *Ekman 11545*, Cordillera Central, Prov. Santo Domingo, La Cumbre, roadsides, ca. 250 m, B, S. — HAITI : *Ekman 229*, Dép. du Sud, prope Civeite Camp Perrin, Aux Cayes, in collibus, B, S. — PORTO RICO : *Garber 142*, prope Jauco, B; *Kuhn 429a*, prope Meriacao, B.

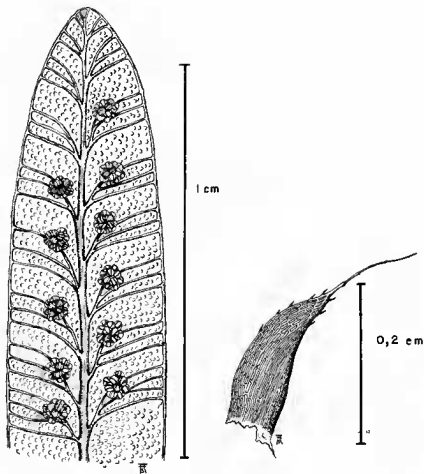
4. *Gleichenia palmata* (Schaffn. ex Fourn.) C. Chr.

Ind. Fil. Suppl. t : t13 (1913).

- *Mertensia palmata* SCHAFFN. ex FOURN., Jour. Mex. Pl. : 137 (1872).
- *Mertensia palmata* SCHAFFN. ex FÉE, Mém. Foug. 9 : 40 (1857), *nom. nud.*
- *Gleichenia palmata* (SCHAFFN. ex FÉE) MOORE, Ind. Fil. : 380 (1862), *nom. nud.*
- *Dicranopteris palmata* UNDERW., Bull. Torrey Bot. Club 34 : 259 (1907); type : *Pringle 6129*, Mexico, Orizaba, in moist woods, US!
- *Sticherus palmatus* (UNDERW.) COPEL., Gen. Fil. 28, 1947.

TYPE : *Schaffner 229*, Mexico, Jotulta at Mirador, P? not seen.

CHROMOSOME NUMBER: $n = 34$, $2x$ (WALKER, 1966).



Pl. 2.

Rhizome partially epigeous, long-creeping, flattened, ligneous, branched, 3 mm in diameter, dark brown, densely covered with adpressed, persistent, rigid, plane, uniform, dark castaneous, concolorous, shining, clathrate, basifixed, ovate-lanceolate scales with an acuminate apex, rounded base, fimbriate margin, and with one layer of cells; *primary rachis* 50-70 cm long, 4-5 mm in diameter, semicircular in cross-section, ligneous, olive green, shining, covered with a few, erect, persistent, soft, light castaneous, concolorous, plane, uniform, shining, clathrate, basifixed linear-lanceolate scales with an acuminate apex, cordate base, ciliate margin, and with one layer of cells; *bud* of the primary rachis up to 2 cm long, covered with linear

scales having a very acuminate apex, otherwise like those of the primary rachis; one pair of equal primary branches, 3.5-6 cm long, leaflets lacking, covered with scales like those of the primary rachis; bud of the secondary rachis like that of the primary one; each secondary rachis bearing one pair of equal secondary branches 4-6 cm long, densely covered with stipule-like leaflets; bud of the tertiary rachis like those of the secondary one; each tertiary rachis bearing a pair of tertiary branches, with leaflets, as penultimate branches; each quaternary rachis bearing a pair of quaternary branches as *ultimate branches*, 16-22 cm long, 3-4.5 cm wide, with a lobed and acute apex, the rachis covered with a few, erect, persistent, rigid, light castaneous, concolorous, plane, uniform, shining, clathrate, basifixed, lanceolate-ovate scales smaller than those of the other parts, with an acute apex, cordate base, ciliate margin, and with one layer of cells; *ultimate segments* 11-9 × 2-2.5 mm, linear, the margin entire, somewhat revolute, the midrib, veins, and tissue clearly pubescent with whitish, stellate, 3- or 4-branched hairs, *veins* 16-25 pairs, once-forked near the base; *sori* many, of 3-5 sporangia, on the acroscopic vein branch, medial.

DISTRIBUTION: Cuba, Mountains of the State of Vera Cruz, Mexico, Alta Verapaz, Guatemala and Blue Mountains, Jamaica at altitudes ca. 1000-1650 m.

SELECTED SPECIMENS CITED: CUBA : *Shafer 9054*, Gran Piedra, ca. 1500 m, P, S, US. — JAMAICA : *Maxon & Killip 1257*, road from Silver Hill Gap (900 m) to Hardware Gap (1200 m), B, S, US.

5. *Gleichenia remota* (Kaulf.) Spreng.

Syst. Veg. 4 : 27 (1827).

- *Mertensia remota* KAULF., Enum. Fil. : 39 (1824).
- *Gleichenia trachyrhizoma* CHRIST, Bull. Herb. Boiss., ser. 2, 6 : 280 (1906); type : *Wercklé s.n.*, Costa Rica, Valle del Río Navarro, ca. 1400 m (P!; iso-, US).
- *Dicranopteris trachyrhizoma* (CHRIST) MAXON, N. Amer. Fl. 16 : 57 (1909).
- *Sticherus trachyrhizoma* (CHRIST) COPEL., Gen. Fil. : 28 (1947).
- *Gleichenia zquilaterale* JENM., Fern Br. W. Ind. and Gulana 353 (1909); type : *Jenman 4149*, Guiana, in forest on the banks of the upper part of Demerara River, NY?
- *Gleichenia williamsii* MAXON, Amer. Fern Journ. 2 : 21 (1912); type : *Williams 917*, Panamá, near Cana, US!

TYPE : presumably *Chamisso*, Brasil, Isle Santa Caterina, PR?

Rhizome partially epigeous, slender, tuberculate, densely covered with erect, persistent, rigid, dark brown, opaque, non-clathrate, linear-lanceolate, shining, ciliate scales; *primary rachis* fleshy, rigid at the base and lightly tuberculate, to slender at the apex and yellow-orange, covered with a few, semi-persistent, dark brown, opaque, non-clathrate, deltoid scales having an acuminate apex, and ciliate margin, one pair of *primary branches*, equal, 10-11 cm long, densely covered with stipule-like leaflets; each secondary rachis bearing two pairs of secondary branches, with leaflets, the internode

between the first (basal) and the second (apical) pair of branches ca. 13 cm long and naked; each tertiary apical rachis (and sometimes also the basal one) bearing a pair of tertiary branches as *ultimate branches*, these 9-10 cm long, 6-10 cm wide, bearing remote to approximate *ultimate segments* 30-70 × 15-19 mm, linear, subcoriaceous, with an entire margin, obtuse at the apex, broader at the base, somewhat revolute, glabrous, below yellowish and glaucous-dotted; costa densely covered with erect, persistent, soft, hyaline, concolorous, shining, clathrate, basipeltate, ovate, very small scales with a piliform apex, roundish at the base, the margin ciliate; *veins* 45-95 pairs, once-forked near the base; *sori* few, of 3 or 4 sporangia supra-medial.

DISTRIBUTION: Cuba, Trinidad, Costa Rica, Venezuela, Guyana, Surinam, Brasil, Colombia and Bolivia.

SELECTED SPECIMENS CITED: CUBA: *Ekman 3847*, Bahía de Taco, Minas de Iberia, ca. 800 m, B, S, US; *Acuña 12350*, Cayo Guan, Vicinity of Moa, US; *Clemente 4044*, Mina Delia, Punta Gorda, north coast of Oriente, P, US.

6. *Gleichenia* × *leonis* (Maxon) C. Chr.

Ind. Fil. Suppl. 3 : 106 (1934).

— *Dicranopteris leonis* MAXON, Jour. Wash. Acad. Sci. 12 : 439 (1922); see DUEK, 1974.

TYPE: *Leon 11092*, Cuba, Province of Oriente, High Sierra Maestra, Pico Turquino region, US!

Rhizome partially epigeous, long-creeping, semicircular in cross section, ligneous, branched, 3-4 mm in diameter, pectinate, covered with imbricate, adpressed, persistent, rigid, plane, dark castaneous, concolorous, shining, non-clathrate, basipeltate, lanceolate-linear, large scales, with a very acuminate apex, truncate at the base, margin fimbriate; *primary rachis* 35-40 cm long, semicircular in cross-section, ligneous, olive-green, darker at the base, somewhat shining, covered with a few, adpressed, semi-persistent, soft, light castaneous, concolorous, shining, plane, non-clathrate, basifixed, linear, little scales with an acute apex, cordate at the base, the margin fimbriate; *bud* of the primary rachis densely covered with erect, persistent, rigid, dark castaneous, medium-sized scales with a whitish margin, these shining, plane, uniform, non-clathrate, basipeltate, linear-lanceolate with a very acuminate apex, cordate at the base, the margin fimbriate, with more than one layer of cells in the medial part; usually one pair of equal *primary branches* 4-5 cm long, leaflets lacking, covered with very rare, small scales like these of the primary rachis, but some roundish at the base and others truncate at the base; the bud of the secondary rachis like that of the primary one; each secondary rachis bearing one pair of equal secondary branches ca. 4 cm long, leaflets lacking, with scales like those of the primary branches; bud of the tertiary rachis like

that of the secondary one; each tertiary rachis bearing a pair of equal tertiary branches ca. 9 cm long with leaflets as penultimate branches; tertiary and quaternary rachises below with scales like those of the primary and secondary branches, but basipeltate and with a piliform apex; each quaternary rachis bearing a pair of quaternary branches as *ultimate branches*, these ca. 28 cm long, 2.5 cm wide, bearing contiguous *ultimate segments* 10-28 × 3-4 mm, olive-green, subcoriaceous, linear, the margin entire, the apex obtuse, glabrous, somewhat revolute, the midrib elevated, densely covered with light castaneous, shining, stellate (many branched) hairs, *veins* 13-32 pairs, once-forked near the base, *sori* many (up to occupying all the veins), chiefly of 4 sporangia, on the acroscopic vein branch, infra-medial; *spores* abortive in all specimens examined.

DISTRIBUTION: Endemic to Cuba.

SELECTED SPECIMENS CITED: CUBA: *Ekman 5585*, Province of Oriente, Sierra Maestra on the divide between Punta de Palma Mocha and the pass between Río Yara and Río La Plata, ca. 1200 m, B, S.

7. *Gleichenia rubiginosa* Mett.

Ann. Sci. Nat. 5 (2) : 267 (1864).

— *Gleichenia rubiginosa* METT. f. *virescens* Hieron., Bot. Jahrb. 34 : 561 (1905); lectotype : *Matthews 1095*, 1835, Perúvia, loco non indicato, B.

TYPE : *Lindig 71*, Colombia, Puente Nacunol, ca. 1900 m (holo-, B; iso-, P! K).

Rhizome epigeous, long-creeping, terete, very tuberculate, ligneous, branched, 2 mm in diameter, dark brown, covered with erect, persistent, rigid, plane, uniform, dark castaneous, concolorous, shining, clathrate, basifixed, lanceolate, scales with a very acuminate apex, rounded base, fimbriate margin, and with one layer of cells; *primary rachis* 35-55 cm long, 2-3 mm in diameter, semicircular in cross-section, ligneous, dark castaneous, shining, glabrous; *bud* of the primary rachis (and all others) covered with adpressed, persistent, soft, rigid, uniform, orange concolorous, shining, clathrate, basifixed, ovate to elliptical scales with a roundish to attenuate apex, truncate base, ciliate margin, and with one layer of cells; more than one pair of equal primary branches, 3-5 cm long, leaflets lacking, covered with scales like those of the buds but with an acuminate apex; each secondary rachis bearing one pair of equal secondary branches as *ultimate branches* of 25 cm long (type), or sometimes each tertiary rachis bearing a pair of equal tertiary branches as *ultimate branches*, and then less long (secondary ca. 4-5 cm long, tertiary ca. 15 cm long).

Ultimate branches 15-25 cm long, 2-3 cm broad, with an acute apex, the rachis covered with scales like those of the buds; *ultimate segments* 10-15 × 2-2.5 mm, linear-lanceolate to lanceolate, the margin entire, sometimes slightly revolute, the midrib, veins, and tissue clearly pubescent

with whitish, dendroid hairs, veins 15-19 pairs, once-forked at the base; sori many, mostly of 4 sporangia, on the acroscopic vein branch, medial, beneath glaucous.

DISTRIBUTION: Porto Rico, Colombia, Ecuador, Perú and Venezuela.

SELECTED SPECIMENS CITED: PORTO RICO : Gleason 33, Cerro de la Punta, 900-1300 m, fragment US. — COLOMBIA : Goudot s.n., s. loc., P; Funck 190, Laguneta, P; Lindig 116, Bogotá, ca. 2900 m, P. — ECUADOR : Sodiro 3/21, s. loc., P; Sodiro s.n., Pichincha, P.

8. *Gleichenia revoluta* Humb., Bonpl. & Kunth

Nov. Gen. Sp. Pl. Prodr. 1 : 129 (1815).

- *Mertensia pruinosa* MART., Icon. Pl. Crypt. : 109 (1834); type : Martius s.n., Brasil, Minas Geraes, fragment US.
- *Gleichenia pruinosa* (MART.) METT., Ann. Mus. Bot. Ludg. Bot. 1 : 49 (1863).
- *Mertensia subflabellata* BRACK, in WILKES, U. S. Expt. Exped. 16 : 294 (1854); type : Wilkes s.n., Brasil, near Rio de Janeiro, US? not seen.
- *Mertensia angusta* KLOTZSCH ex STURM, in MART., Fl. Bras. 1 (2) : 225 (1859); type : Sellow s.n., Brasil, B.
- *Gleichenia revoluta* HUMB., BONPL. & KUNTH var. *angusta* (KLOTZ. ex STURM) CHRIST, Denssch. K. K. Akad. Wissensch. Wien 79 : 48 (1908).
- *Gleichenia affinis* METT. ex KUHN, Linnæa 36 : 167 (1869); type : Lechler 2265, Perú, St. Gavan, B.
- *Gleichenia affinis* METT. ex KUHN var. *glabra* KUHN, Linnæa 36 : 168 (1869).
- *Gleichenia affinis* METT. var. *pachensis* Hieron., Hedwigia 48 : 286 (1909); syntypes : Stuebel 549, Colombia, Páramo de Pacho, between Bogotá and Mayo, B; Lindig 116, pro parte, Colombia, Bogotá, B.

SYNTYPES : Humboldt & Bonpland s.n., Ecuador, Páramo Saraguro, P; Humboldt s.n., Monte Pulla, P? not seen.

Small, erect plant, up to 1 m high, with branches up to the fifth order; rhizome hypogeous, long-creeping, terete, ligneous, freely branched, 3 mm in diameter, covered with rare, persistent, erect, rigid, flat, dark castaneous, concolorous, uniform, clathrate, basifixed, ovate-lanceolate scales having a piliform apex, truncate at the base, with a fimbriate margin and one layer of cells; primary rachis 30-60 cm long, 2-3 mm in diameter, circular in cross-section, ligneous, dark castaneous to purple, shining, glabrous; bud of the primary rachis covered with imbricate, persistent, adpressed, rigid, flat, light castaneous, shining with light base, clathrate, basifixed, deltoid scales with an acuminate apex, roundish at the base, with a fimbriate margin and one layer of cells; usually more than one pair of primary branches these equal, 4-6 cm long, 1-1.5 mm in diameter, leaflets lacking, covered with scales like those of the primary rachis; bud of the secondary rachis covered with scales like those of the bud of the primary rachis; each secondary rachis bearing one or two pairs of equal secondary branches, ca. 2-3 cm long, 1-1.5 mm in diameter, covered with stipule-like leaflets and densely with scales like those of the primary branches; bud of the tertiary

rachis like that of the secondary one; each tertiary rachis bearing a pair of equal tertiary branches, leafy, 8-1 cm long, 0.5-0.8 cm wide, sometimes these subdivided (and then shorter, ca. 2-4 cm long) in equal branches of the fourth (rarely fifth) order as *ultimate branches*, 8-10 cm long, 0.5-0.8 cm wide, linear to linear-lanceolate, densely covered below on the costa with scales like those of the primary rachis; *ultimate segments* 3.5 × 1.2 mm, rigidly herbaceous, approximate, ovate to subacute at the apex, the margin entire, revolute, dark, densely covered with adpressed, soft, persistent, orange, bright, concolorous, dendroid having a pointed apex, sessile; *veins* elevated, 10-22 pairs; once-forked near the base; sori many, of 3 or 4 sporangia, on the acroscopic vein branch, medial.

DISTRIBUTION: Santo Domingo, Haiti, Costa Rica, Colombia, Ecuador, Perú, Venezuela and Brasil.

SELECTED SPECIMENS CITED: SANTO DOMINGO : *Ekman 13654*, Cordillera Central, Prov. Azua, La Pelona, slope in Pinelands, ca. 2800 m, B, S. — HAITI : *Ekman 5328*, Massif de la Holte, western group, Torbec, forming very dense colonies on top of the ridges above La Marc Proux, on laterites, ca. 1780 m, B, S.

DICRANOPTERIS Bernhardi

Schrad. Neu. Jour. Bot. 1 (2) : 38 (1806).

— *Hieriopteris* PRESL, Epim. Bot. : 26 (1851), non CHING, nec COPEL.

Rhizome protostelic or solenostelic, covered with multiseptate hairs fringed at the base; bud of main rachis covered with hairs like those of the rhizome; *primary branches* repeatedly pseudo-dichotomously branched, the bud between each pair of branches usually permanently dormant, the pair of branches equal or unequal with a short, stipule-like, lobed leaflet usually present at the base; a pair of accessory branches, bearing a lamina like that of the ultimate branches, present at some of the forks of the lateral branch-systems, on the outside of the fork and deflexed, otherwise only the *ultimate branches* laminate, the *laminae* pinnatifid, always cut to the costa (pectinate), *veins* in each ultimate segment pinnate, with a midrib extending to the apex, at least twice-forked; *sori* several to each ultimate segment, borne on an acroscopic vein branch (rarely also on a basisopic branch), each consisting of 8-15 or more sporangia, without paraphyses, the sporangia smaller than in *Gleichenia*; *spores* monolete or trilete.

TYPE SPECIES : *Dicranopteris dichotoma* (Thunb.) Bernh. (= *Polypodium dichotomum* Thunb., (1784) which is a synonym of *Polypodium lineare* Burm., (1768).

Two subgenera, *Dicranopteris* Bernh., and *Acropterygium* (Diels) Holtt.

KEY TO THE SUBGENERA AND SPECIES OF DICRANOPTERIS
IN THE GREATER ANTILLES

1. With accessory branches (as the ultimate branches) deflexed at the base of each bifurcation; vascular system of the rhizome a protosteles; spores trilete (subg. *Dicranopteris*)..... 9. *D. flexuosa*
1'. Without accessory branches; vascular system of the rhizome a solenostele; spores monolete (subg. *Acropterygium*)..... 10. *D. pectinata*

subg. DICRANOPTERIS

— *Gleichenia* subg. *Mertensia* sect. *Heteropterygium* DIELS in ENGL. & PRANTL, Nat. Pflanz. 1 (4) : 355 (1900).

Rhizome protostelic; one pair of accessory branches, bearing a laminae like those of the ultimate branches, present at some of the forks of the lateral branch-systems, on the basiscopic side and deflexed.

DISTRIBUTION: Pantropical.

9. *Dicranopteris flexuosa* (Schrad.) Underw.

Bull. Torrey Bot. Club. 34 : 254 (1907).

- *Mertensia flexuosa* SCHRAD., Goett. Gef. Anz. 1824 : 863 (1824).
— *Gleichenia flexuosa* (SCHRAD.) METT., Ann. Lugd. Bot. 1 : 50 (1863).
— *Mertensia rigida* KUNZE, Linnaea 9 : 16 (1824); type : *Poeppig 1153*, Peru, Chibangata, LZ, *delet.*
— *Gleichenia rigida* (KUNZE) BOMMER & CHRIST, Bull. Soc. Roy. Bot. Belg. 35 (1), Mém. : 174 (1896), non J. SMITH (1841).
— *Mertensia pumila* MART., Icon. Crypt. Vasc. Bras. 111, tab. 60, fig. 2 (1834); type : *Martius s.n.*, Brasil, « Sierra de Estrella, Prov. Sebastianopol », M.
— *Mertensia sculpturata* FÉE, Crypt. Vasc. Brés. 1 : 199, tab. 72, fig. 1 (1869); syntypes : *Clauser 102 a*, Brasil, P; *Glazion 364*, Brasil, P; *Glazion 1695*, Brasil, Rio de Janeiro (P; iso-, C).

TYPE : *Prince Maximilian van Neuwied s.n.*, Brasil, M.

Rhizome hypogeous, short-creeping, terete, ligneous, somewhat branched, 3 mm in diameter, densely covered with adpressed, persistent, rigid, light castaneous, pluricellular, simple hairs with an acute apex; primary rachis 40-50 cm long, 3-4 mm in diameter, circular in cross-section, ligneous, light brown, sometimes nearly stramineous, shining, glabrous; bud of the primary rachis (and those of all other orders) covered with small, stipule-like leaflets and at the basiscopic side of such buds usually a pair of deflexed pinnae similar to but smaller (3-7 cm long), than those of the ultimate branches; usually more than one pair of unequal primary branches 5 and 7 cm long, elminate, glabrous; each secondary rachis bearing a pair (sometimes two) of secondary branches, these unequal, 2.5 and 3 cm long, glabrous, each tertiary rachis bearing a pair of tertiary branches, these unequal, each one bearing branches of fourth order as ultimate branches,

and only these laminate, 16-20 cm long, 2.5-3 cm wide, lanceolate, the apex acuminate, the rachis glabrous, bearing contiguous *ultimate segments* 8-22 × 1.5-2.1 mm, light green, subcoriaceous, glabrous, linear, very revolute, with an entire margin, an obtuse apex, and a midrib elevated on both sides, the *veins* 8-21, the veinlets on the lower part 2-forked, in the upper part the basiscopic branch simple and only the acroscopic one 2-forked; *sori* many, chiefly of 6 sporangia, on the acroscopic vein branch, inframedial.

DISTRIBUTION: Cuba, Jamaica, Santo Domingo, Haiti, Porto Rico, U.S.A., México, British Honduras, Guatemala, Honduras, Costa Rica, Panamá, Colombia, Ecuador, Perú, Venezuela, Guyana, Surinam, Brasil, Bolivia.

SELECTED SPECIMENS CITED: CUBA : *Clemente 743*, Loma del Gato, camino de Armenia, ca. 890 m, P. — JAMAICA : *Underwood 3101*, Gordontwon to Cinchona, Salt Hill Pond, U.S. — SANTO DOMINGO : *Allard 14920*, vicinity of Jarabacoa, Province of La Vega, S, U.S. — HAITI : *Ekman 10755*, Massif de la Holte, western group, Corail, at Dutremil, laterite soil, ca. 250 m, B, S. — PORTO RICO : *Heller 4353*, 2 mi. northeast of Mayaguez, B.

subg. ACROPTERYGIUM (Diels) Holtt.

Reinwardtia 4 : 261 (1957).

- *Gleichenia* subg. *Mertensia* sect. *Acropterygium* DIELS, in ENGL. & PRANTL, Nat. Pflanz. 1 (4) : 353 (1900).
- *Acropterygium* (DIELS) NAKAI, Bull. Nat. Sci. Mus. Tokyo 29 : 5 (1950).
- *Gleichenella* CHING, Sunyatsenia 5 : 276 (1940).

TYPE SPECIES: *Mertensia pectinata* Willd.

DISTRIBUTION: One species in Tropical America.

10. *Dicranopteris pectinata* (Willd.) Underw.

Bull. Torrey Bot. Club 34 : 260 (1907).

- *Mertensia pectinata* WILLD., Kongl. Vet. Ak. Nya Handl. 11 (25) : 168, tab. 4 (1804).
- *Mertensia glaucescens* HUMB. & BONPL. ex WILLD., Sp. Pl., ed. 4, 5 : 72 (1810); type : *Humboldt & Bonpland*, Venezuela, Cumaná (B; iso-, P).
- *Mertensia brasiliiana* DESV., Ges. Naturf. Freund. Mag. Berlin 5 : 329 (1811); type : *sine coll.*, Brasil, P.
- *Gleichenia nitida* PRESL, Rel. Haenk. 1 : 70 (1825); type : *Haenke s.n.*, México, PR, fragment US.
- *Mertensia nitida* (PRESL) PRESL, Tent. Pierid. : 51 (1836).
- *Mertensia glaucescens* HUMB. & BONPL. ex WILLD. var. *cubense* FÉE, Mém. Foug. 11 : 212 (1866); syntypes : *Galeotti 6402*, Mexico, P; *Jussac*, Hispaniola, P?
- *Mertensia glaucescens* HUMB. & BONPL. ex WILLD. var. *mexicana* FÉE, Mém. Foug. 11 : 212 (1866); syntypes : *Galeotti 6402*, México, P; *Jussac*, Hispaniola, P?
- *Gleichenia linearis* var. *depauperata* CHRIST, Bull. Herb. Boiss., ser. 2, 5 : 14 (1905); type : *Wercklé s.n.*, Costa Rica, P.
- *Gleichenia pectinata* WILLD. var. *sublinearis* CHRIST, Bull. Herb. Boiss., ser. 2, 6 : 282 (1906); syntypes : *Wercklé s.n.*, Costa Rica, Santiago, ca. 900 m; *Wercklé s.n.*,

Costa Rica, Navarro, P; *J. V. Smith 4994*, Costa Rica, Navarro, P, US; *Pittier 4437*, Costa Rica, Bacacay, P, US.

TYPE : *Bredmeyer s.n.*, Venezuela, Caracas, B!

CHROMOSOME NUMBER: $n = c. 43, 2x; c. 44$ (SORSA, 1968).

Rhizome long creeping, 3-5 mm in diameter, with a rough surface caused by the persistent bases of numerous, articulate, castaneous, deciduous hairs; *primary rachis* stout, rigid, 3-6 mm in diameter, semicircular in cross-section, ligneous, stramineous to light castaneous, glabrous; *bud* of the primary rachis (and those of all other orders) abortive and covered with stipule-like leaflets, the buds of the rachises of the fourth and fifth orders also with small, simple multiseptate, dark castaneous hairs with an acute apex; one pair of unequal *primary branches* ca. 15 cm long, 3 mm wide, circular, elaminate, glabrous, light castaneous; each secondary rachis bearing a pair of very unequal secondary branches, 5 and 12 cm long, elaminate, glabrous; each tertiary rachis bearing a pair of unequal tertiary branches, 2 and 3.5 cm long, more slender than the former, terete, elaminate, glabrous, dark castaneous; each quaternary rachis bearing a pair of unequal quaternary branches, 2 and 4.5 cm long, somewhat flattened, glabrous, winged, the larger branch bearing a pair of branches of the fifth order, these unequal, 2 and 4 cm long, glabrous, and sometimes each bearing branches of a sixth order as *ultimate branches*, only the ultimate branches laminate, the laminae 11-16 cm long, 2-4.5 cm wide, very acuminate at the apex, *ultimate segments* 9-32 \times 3.5-5 mm, linear, with an entire margin and an obtuse apex, beneath glaucous, the midrib and veins very elevated, below covered with a few very small, stellate (three-branched), uni- and bicellular, yellowish to light castaneous hairs with an acute apex, *veins* 11-28 pairs, the veinlets with the basicopic branch simple and the acroscopic one 2-forked; *sori* many, chiefly of 15 sporangia, clustered in the form of a rosette on the acroscopic vein branch, inframedial.

DISTRIBUTION: Cuba, Jamaica, Santo Domingo, Porto Rico, St. Rose, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada, Tobago, Trinidad, México, British Honduras, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panamá, Colombia, Ecuador, Perú, Venezuela, Guyana, Surinam, French Guiana, Brasil, Bolivia.

SELECTED SPECIMENS CITED: CUBA : *Maxon 4069*, upper slopes and summit of Gran Piedra, ca. 1200 m, P, U.S. — JAMAICA : *Yuncker 17918*, roadside embankment, on way to Bull Head Peak, ca. 600 m, S. — SANTO DOMINGO : *Ekman 12393*, Cordillera Central, Prov. St. Domingo, Villa Altigracia, Loma Mariana Chica, ca. 500 m, B, S. — PORTO RICO : *Sintenis 1768*, Sierra de Luquillo, mittere Region des Montes Hymene, B.

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